GORBACHEV, S. V.

PA 196T21

USSR/Chemistry - Electrodeposition of Copper   Nov 51

"Cathodic Polarization in the Case of Deposition of Copper From Complex Electrolytes," S. V. Gorbachev, A. V. Izmaylov, Chem Technol Inst imeni D. I. Mendeleyev, Moscow

"Zhur Fiz Khim" Vol XXV, No 11, pp 1384-1395

Investigated character of cathodic polarization in case of deposition of Cu from electrolytes congt following compds with form complex salts with Cu: H_2SO_4; $Na_2C_2O_4$; tartaric acid; mono-, di-, triethanolamines; pyridine; polyhydric alcs (ethyleneglycol, glycerin, pentaerythritol); P_2O_7; NH_3. Examines, analyzes, and discusses different electrode processes occurring, includ- ing polarization and the observed strong braking process, and effect of nature of complex compd on these processes.

USSR/Chemistry - Electrodeposition of Copper (Contd)   Nov 51

196T21

CA

3

Relation between the temperature coefficients of the shift of the absorption bands of hydrated ions and their thermodynamic parameters. S. V. Gorbachev and P. A. Zagorets (D. I. Mendeleev Chem.-Technol. Inst., Moscow). Doklady Akad. Nauk S.S.S.R. 81, 625-7(1951).—The positions of both the max. and long-wave edge of the ultraviolet absorption bands of hydrated ions in aq. soln. are shifted to longer waves with rising temp. The shift is uniform, i.e. equal in the temp. intervals 20-40, 40-60, and 60-80°; an exception is Fe³⁺, the lower absorption branches of which band strongly towards the visible at temps. of 60 and 80°, evidently as a result of hydrolysis. Exptl. data (temp. interval, total shift of the absorption band in cm.⁻¹, temp. coeff. $\alpha = \Delta H/\Delta T$ of the shift of the long-wave edge of the band, in cal./mole degree) are: Ag⁺, 20-80°, 450, -21.4; Tl⁺, 20-80°, 390, 18.5; Cu²⁺, 20-80°, 1380, 61.8; Hg²⁺, 20-80°, 1030, 49.2; Fe³⁺, 20-80°, 2240, 100.6; Cl⁻, 17-75°, —, 70; Br⁻, 0-98°, 2360, 67.4; I⁻, 20-80°, 1285, 61.1; NO₃⁻, 20-80°, 985, 46.9. In the series of cations and of anions, α increases linearly with the generalized moment z/r, where $z =$ charge, and $r =$ radius of the ion. The slopes are given by, for the cations, $\alpha = 24.8 \, z/r$, and for the anions $\alpha = 126 \, z/r$. Insofar as the shift of the absorption band with rising temp. corresponds to a weakening of the band between the ion and the H₂O mols., α should be a direct expression of the entropy of hydration ΔS. Plots of the exptl. α as a function of the standard ion entropy $S°$ are 2 parallel straight lines, one for the cations, the other for the anions. The α of the cations are identical with the ΔS, and for the anions the α are proportional to ΔS. The plot of α as a function of ΔS, for the cations, is a straight line passing through the origin, at a slope of 45° (if α and ΔS are on the same scale). The line of the anions is parallel to the line of the cations, and lies 44 entropy units above it.   N. T.

GORBACHEV, S. V., STAROSTENKO, YE. P.

Zinc

Effect of temperature on the rate of electrocrystallization of zinc and cadmium.
Zhur.fiz.khim., 16, No. 6, 1952.

IZMAYLOV, A. V.; GORBACHEV, S. V.

Polarization

Cathodic polarization during deposition of copper from
solutions of exalates and aminoethanols. Zhur. fiz. khim.
26 no. 2. 1952

9. Monthly List of Russian Accessions, Library of Congress, September 1953, Uncl.

GORBACHEV, S. V.; IZMAYLCV, A. V.

Polarization (Electricity)

Cathodic polarization during deposition of copper from
pyrophosphate solutions, Zhur. fiz. khim. 26 no. 3, 1952

9. Monthly List of Russian Accessions, Library of Congress, __September__ 1953 Uncl.

GORBACHEV, S. V.

USSR/Chemistry - Electrochemistry   Jun 52

"Effect of Temperature on the Rate of Electrolytic Deposition of Zinc and Cadmium," S. V. Gorbachev, Ye. P. Starostenko, Chem-Technol Inst imeni D. I. Mendeleyev, Moscow

"Zhur Fiz Khim" Vol XXVI, No 6, pp 787-791

Investigated dependence of the rate of the cathodic process of Zn and Cd deposition from solns of their simple salts on the temp within the range 10-100°. Established that the rate of deposition 1st rises with rising temps and then drops at high temps,

220T26

Just as in the case of Cu. Appearance of a max on the current-temp curve must be ascribed to polarization connected with the formation of a new phase.

220T26

USSR/Chemistry - Electrochemistry   Jun 52

"Effect of Temperature on the Rate of Electrolytic Deposition of Silver," S.V. Gorbachev, Ye.P. Starostenko, Chem-Technol Inst imeni D.I. Mendeleyev.

"Zhur Fiz Khim" Vol XXVI, No 6, pp 802-809

Investigated dependence of the rate of Ag deposition from aq $AgNO_3$ soln on the temp within the range 10-100°. Found that max appears on current-temp curve, just as in the cases of Cu, Zn, or Cd, and for the same reason.

220T27

GORBACHEV, S. V. , STAROSTENKA, YE. P.

Copper

Effect of temperature on the rate of electrocrystallization of copper. Zhur.fiz.khim,
26, No.5, 1952.

9. Monthly List of Russian Accessions, Library of Congress,November 1952 19XX, Uncl.

GORBACHEV S.V.   *Sep. 52*

USSR/Chemistry - Polarization

"The Combination of Concentration and Chemical Polarization," S.V. Gorbachev
Inst. im D.I. Mendeleyev, Moscow

Zhur Fiz Khim, Vol 26, No.9, pp 1303-1310

An eq is proposed expressing the realtion bet the cd and the conditions of electrolysis when
there is combination of concn polarization with chem polarization. The theoretical eq agrees
satisfactorily with the previously ded empirical relation bet cd and temp. The eq expresses
the smooth change of exptl activation energy with increasing polarization potential. The
author states that this gives the true relation bet the cd and potential. It is noted
that the velocity characteristics of the electrolysis kinetics and the magnitude of the
activation energy of chem polarization have a great effect on the results obtained by
the conventional graphic method of detg the potentials of decompn

                                                                263 T 22

GORBACHEV, S. V.

(3)   6

Self-accelerated reactions. S. V. Gorbachev (D. I.
Mendeleev Chem.-Technol. Inst., Moscow). Zhur.
Fiz. Khim. 26, 1504-18(1952); cf. Shilov, Ber. 36, 2735(1903).—
A derivation is given of the equation of Shilov (loc. cit.) for
the kinetics of self-accelerating reactions. A method is
shown for detn. of the consts. of the Shilov equation from
exptl. data. An equation is given for calcn. of reaction
rate as a function of time. As an example of self-accelerat-
ing reactions, the oxidation of Ag abietate reported by
Pavlyuchenko (C.A. 46, 2383b) is discussed. The equation
of Christiansen and Kramers (C.A. 17, 2985) is derived and
shown to be purely empirical.   J. W. Loweberg, Jr.

1. GORBACHEV, S. V.

2. USSR (600)

4. Chemical Reaction - Mechanism

7. Theory of autocatalytic.reactions. Zhur. fiz. khim. 26, No. 10, 1952.

       The derivation of N. A. Shilov's eq for the kinetics of spontaneously accelerating reactions is given. A method for detg the const of ShilOv's eq from exptl data is described. An eq for detg the reaction rates as a function of time is given. On the example of the oxidation of silver abietate, the effect of the temp on the kinetics of spontaneously accelerating reactions is illustrated. A derivation of the Christianson-Kraners eq is given. It is shown that this eq has a purely empirical character.

                          256T38

9. Monthly List of Russian Accessions. Library of Congress. March, 1953. Unclassified

GORBACHEV, S.V.

The Committee on Stalin Prizes (of the Council of Ministers USSR) in the fields of science and inventions announces that the following scientific works, popular scientific books, and textbooks have been submitted for competition for Stalin Prizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 22-40, 20 Feb - 3 Apr 1954)

Name	Title of Work	Nominated by
Gorbachev, S.V. Khomutov, N.Ye. Izmaylov, A.V. Starostenko, Ye.P. Vasenin, R.M. Zhuk, N.P.	"Investigations in the Field of the Kinetics of Electrochemical Reactions"	Moscow Chemicotechnological Institute imeni D.I. Mendeleyev

SO: W-30604, 7 July 1954

Gorbachev, S. V.

Influence of Temperature on the Speed of Electrolysis.
S. V. Gorbachev (Trudy Soveshchaniya po Elektrokhimii
1950, 1953, 243-218).—[In Russian]. A review of Russian
work.—G. V. E. T.

1. GORBACHEV, S. V.

2. USSR (600)

4. Physicists

7. Vasiliy Vladimirovich Petrov, his life and work. Prof. B. B. Kudryastsev.
   Reviewed by S. V. Gorbachev. Znan. sila no. 2, 1953.

9. **Monthly List of Russian Accessions**, Library of Congress, _____May_____ 1953. Unclassified.

GORBACHEV, S-V·

Chem abs, v, 48,

1-10-54

Electrochemistry

chem[6]
③

Polarization for the deposition of copper from solutions of simple salts. S. V. Gorbachev and R. M. Vasenin (D. I. Mendeleev Chem.-Technol. Inst., Moscow). Zhur. Fiz. Khim. 27, 201-7(1953); cf. C.A. 46, 10070d.—The cathodic polarization, ΔE, of Cu in 0.05-0.1M CuSO$_4$ at a const. c.d., I, had a min. near 50°; the region 0°-90° was investigated. This effect was not due to hydrolysis of CuSO$_4$ since a min. (although less pronounced) of ΔE was observed also in 0.1M CuSO$_4$ + 0.02M H$_2$SO$_4$. At a const. ΔE, the curves of log I against $1/T$ (T was abs. temp.) showed a max. each (at T_m). If I_m was the max. value of I and $r = T_m/T$, the equation log $(I/I_m) = 3n[\log r - 0.4343 (r - 1)]$ was approx. valid. The av. no., n, of atoms in a crystal nucleus was 30-150 depending on T and ΔE. Thus, the polarization was due to retardation of growth of a new phase.   J. J. Bikerman

GORBACHEV, S. V.

Chemistry

Thermodynamic criteria of the reversible equations of electro...

overvoltage ... ization c.d. decreases to zero. The thermodynami... tion of Kobozev does not contradict ... G.'s equation (C.A. 47, 4767e) can be expressed ...

Translations { D 22 8108, 7 Feb 55
2524467, 30 Dec 54

Dissociation of several addition compounds in nitrobenzene.
(D. I. Mendeleev
Fiz. Khim. 27, 1301-5(1953); cf. Brown
10, 2439.—The dissocn. consts. K were deter.
for the addn. compds. picric acid (I napht...) II
I-anthracene (III), dissolved in PhNO₂, at ... from
0.015 to 0.025M for I-II and from ...
I-III. Values of K calcd. by the equation of B and B
(loc. cit.) for I-II and I-III are 0.206 and 0.0047 resp. The
ionization const. of I in PhNO₂ is ...

U S S R .

Refractometric study of solutions of molecular compounds of picric acid. E. Ya. Mindovich and S. V. Gorbachev (D. I. Mendeleev Chem.-Technol. Inst., Moscow). *Zhur. Fiz. Khim.* 27, 1404-9(1953); cf. preceding abstr.—The n and d. were measured of $PhNO_2$ solns. of various concns. of picric acid (I), naphthalene (II), anthracene (III), benzene (IV), and the addn. compds. I-II, I-III, and I-IV. Values of n and d. (d) were those given by the equations $n = k_1 c + n_0$ and $d_1 = k_2 c + d_0$, where k_1 and k_2 are tabulated consts., c is concn., and n_0 and d_0 refer to the pure solvent. Values of soly. at $20°$ in $PhNO_2$ of I, II, III, I-II, and I-III are 1.345, 2.536, 0.0812, 0.352, and 0.149 moles/l., resp. Calcd. values of the specific, r, and molar, R, refractions are tabulated and graphed; values of R for I, II, III, IV, I-II, I-III, and I-IV are 60.44, 43.91, 64.23, 26.30, 92.11, 108.00, and 76.77. The deviation of R for the addn. compds. from the sum of R for their components is mentioned.

J. W. Loweberg, Jr.

GORBACHEV, S.V.

Dielectric constants of some molecular compounds of picric acid. E. Ya. Mindovich and S. V. Gorbachev (D. I. Mendeleev Inst. Chem.-Technol. Moscow). Zhur. Fiz. Khim. 27, 1696-8(1953).—Dielec. const. and tangent of loss angle, detd. with 50 cycles/sec. at 20° were 2.992 and 0.0052 for picric acid, 2.699 and 0.0981 for naphthalene, 2.844 and 0.082 for anthracene, and 2.795, 2.850, 2.770 and 0.1020, 0.1012, 0.1031 for 1:1 compds. of picric acid with C_5H_5, $C_{10}H_8$, and $C_{14}H_{10}$, resp.
J. J. Bikerman

Equilibrium distribution of picric acid between water and nitrobenzene. I. S. V. Gorbachev and E. Va. Mindovich (D. I. Mendeleev Chem. Technol., Moscow). Zhur. Fiz. Khim. 27, 1837-41(1953).—If c_1 and c_2 are the equil. concns. (mole/L.) of picric acid in H_2O and $PhNO_2$, resp., $c_2^{0.50} = 0.000107c_1$ at 20° between $c_1 = 0.0030$ and 0.0075. The H_2O used was freed from CO_2. II. Ibid. 1842-7.—In the equation $c_2 = Kc_1^n$, n and K are 2.42 and 0.00035 at 40°, 2.20 and 0.00124 at 60°, and 2.09 and 0.0029 at 80°, between $c_1 = 0.003$ and 0.011. The const. n is inversely proportional to abs. temp. T, and $K = \text{const.}\ e^{-A/T}$; $A = 4690$.   J. J. Bikerman

GORBACHEV'S, S. V.

USSR/Chemistry - Reaction Kinetics   Dec 53

"S. V. Gorbachev's Article on the Theory of Self-Accelerating Reactions," R. M. Flid

Zhur Fiz Khim, Vol 27, No 12, pp 1885-6

Discusses S. V. Gorbachev's comparison (Zhur Fiz Khim, Vol 26, p 1504, 1952) between N. A. Shilov's kinetic eqs and those of Christiansen and Kramers. Disagrees with his conclusions on the ground that he used erroneous derivations of both set of eqs.

275T19

Subject	:	USSR/Chemistry
Card	:	1/1
Authors	:	Kabanov, B. N. and P. D. Lukovtsev
Title	:	Letter to the Editor
Periodical	:	Usp. khim. 23, No. 3, 397-400, 1954
Abstract	:	Critical review of a textbook of theoretical electro-chemistry: "Course in Theoretical Electrochemistry", by N. A. Izgaryshev and S. V. Gorbachev, 1951.
Institution	:	None
Submitted	:	No date

AID P - 272

GORBACHEV, S. V.

USSR/Chemistry - Electrodeposition

Card 1/1   Pub. 147 - 19/26

Authors   : Gorbachev, S. V., and Vasenin, R. M.

Title   : Effect of potassium ions on the copper electrodeposition process

Periodical : Zhur. fiz. khim. 28/1, 135-146, Jan 1954

Abstract   : The polarization of a Cu electrode during Cu deposition in the presence of
potassium ions of various concentrations, introduced in the form of K_2SO_4,
was investigated. A connection between the phase-polarization and other
forms of polarization and the gradual conversion of the phase polarization
into concentrational was observed during an increase in the potential which
occurs during constant potassium ion concentration and during increase in
potassium ion concentration at a constant potential. The effect of K^+ on
the activation energy of concentrational polarization is explained. The
current density in all instances, with exception of high temperatures or low
potentials, was found to be decreasing under the effect of K_2SO_4. Twenty-one
references : 20-USSR and 1-German (1917-1953). Graphs; drawings.

Institution : The D. I. Mendeleyev Chemical-Technological Institute, Moscow
Submitted   : April 10, 1953

GORBACHEV, S. V.

USSR/Chemistry - Electrolysis

Card 1/1   Pub. 147 - 26/26

Authors   : Gorbachev, S. V.

Title   : Electrolysis as a phase sequence

Periodical   : Zhur. fiz. khim. 28/1, 190-192, Jan 1954

Abstract   : The complexity of the electrolysis process, which consists of various phases, is explained. The phase which limits the electrolysis was found to be the one which depends to a large extent upon the variations in the magnitude of the basic parameter of the electrolysis process. The selection of the basic electrolysis parameter is determined by practical deliberations, first of all by the consumption of energy fed to the electrolyzer. The electrical current energy is utilized for the electrolysis and for changes in the state at various phases of the process. Constancy of the current intensity in all phases of the electrolysis process is attained when the process in itself is stationary.

Institute   : The D. I. Mendeleyev Chemical - Technological Institute, Moscow

Submitted   : September 5, 1953

GORBACHEV, S. V.

USSR/ Chemistry - Chemical technology

Card 1/1   Pub. 147 - 6/27

Authors   : Izmaylov, A.V., and Gorbachev, S.V.

Title   : Dispersibility of complex Cu-electrolytes containing ethanolamines

Periodical : Zhur. fiz. khim. 28/2, 229-235, Feb 1954

Abstract   : The effect of concentration and other factors on the dispersibility and
distribution of Cu on a Cu-cathode, in complex ethanolamine containing
electrolytes, was investigated. The introduction into the electrolyte
of a complex forming agent – monoethanolamine and triethanolamine – was
seen to increase the dispersibility and better distribution of the metal.
Increased temperature decreases the dispersibility of the electrolyte and
impairs the distribution of the metal. The effect of the electrode
potential on the dispersibility and distribution of the metal is discussed
and a direct dependence and parallelism between the dispersibility of the
electrolyte and the magnitude of the activation energy was established. Six
references: 5-USSR and 1-USA (1923-1952). Diagrams; graphs.
Institution : The D.I. Mendeleyev Chemical-Technological Institute, Moscow
Submitted   : April 9, 1953

GORBACHEV, S. V.

USSR/Chemistry - Chemical technology

Card 1/1   Pub. 147 - 7/27

Authors   : Gorbachev, S.V., and Izmaylov, A.V.

Title   : Dispersibility of complex Cu electrolytes containing sodium pyrophosphate

Periodical   : Zhur. fiz. khim. 28/2, 236-239, Feb 1954

Abstract   : The dispersibility and distribution of a metal on the surface of an angular
               cathode, during the deposition of Cu in the presence of pyrophosphate solu-
               tions, was investigated. It was established that temperature changes in
               the case of electrolytes having pyrophosphate additions do not affect the
               dispersibility and metal distribution on an angular cathode. The magnitude
               of the electrode potential had a definite opposite effect on the dis-
               persibility and metal distribution. The effect of the concentration, of the
               introduced complex forming agent ($Na_4P_2O_7$), is explained. An entirely
               different mechanism of the cathodic process was observed during the Cu-ion
               discharge from the pyrophosphate electrolytes. Three USSR references (1949-
               1954). Graphs.

Institution : The D.I. Mendeleyev Chemical-Technological Institute, Moscow

Submitted   : April 9, 1953

GORBACHEV, S. V.
USSR/Chemistry

Card 1/1

Authors	:	Gorbachev, S. V.
Title	:	Review of Shilov's Equation.
Periodical	:	Zhur. Fiz. Khim. Vol. 28, Ed. 4, 760-761, Apr 1954
Abstract	:	The article contains comprehensive critical review of N. A. Shilov's Equation, used for determination of the kinematics of bond reactions, and the presentation of contemporary mathematical theory on above reactions by A. S. Akulov. Three references.
Institution	:	D. I. Mendeleev's Chemico-Technological Institute, Moscow.
Submitted	:	February 4, 1954

GORBACHEV, S. V.

USSR/Chemistry - Fuels

Card 1/1

Authors   : Gorbachev, S. V., and Kudryashov, I. V.

Title   : Dependence of partial pressures of a toluene - 2, 2, 4 - trimethylpentane system upon the composition at 40°C temperature

Periodical   : Zhur. Fiz. Khim., 28, Ed. 5, 902 - 905, May 1954

Abstract   : The toluene - 2, 2, 4 - trimethylpentane system was investigated by a new method applied in the measurement of partial pressures of components of brinary liquid systems. The experimental procedure of the investigation is described. The results showed that the dependence of the partial pressure upon the composition of the studied system has a negative deviation from ideality. Three USSR references. Tables, drawing.

Institution : The D. I. Mendeleyev Chemical-Technological Institute, Moscow

Submitted   : Oct. 1, 1953

GORBACHEV, S. V.

USSR/Chemistry   Physical chemistry

Card   : 1/1

Authors   : Gorbachev, S. V., and Yurkevich, Yu. N.

Title   : About the kinetics of electrolytic nickel-plating

Periodical : Zhur. fiz. khim. 28, Ed. 6, 1120 - 1128, June 1954

Abstract   : New data on the electrolytic nickel-plating of metal surfaces, are
              presented. The polarization during electrolysis of $NiCl_2$ solutions in
              water and the changes in polarization, as result of temperature
              fluctuations, are explained. The effect of temperature, on the mechanism
              of electrolytic nickel-plating, is discussed. Structural diagrams, of
              the plating obtained during electrolysis of a $NiCl_2$ solution at 20 and 80°,
              are included. Eleven USSR references. Graphs.

Institution : The D. I. Mendeleyev Chemical-Technological Institute, Moscow

Submitted   : November 18, 1953

Evaluation B-82753

GORBACHEV, S. Y.

USSR/Chemistry - Physical chemistry

Card 1/1   Pub. 147 - 1/27

Authors   : Izmaylov, A. V., and Gorbachev, S. V.

Title   : Theory of dispersibility of complex cupric electrolytes

Periodical : Zhur. fiz. khim. 28/9, 1529-1538, Sep 1954

Abstract   : Experiments with complex cupric electrolytes showed that the nature of its
              dispersibility is determined by the mechanism of the cathodic process and
              type of polarization. The two possible mechanisms of the cathodic process,
              during cathode separation of metals from solutions of complex compounds, are
              explained. A definite relation between dispersibility and temperature, cath-
              ode potential and concentration of the complex forming agent was established.
              A theoretical approach toward selection of conditions most favorable for the
              obtainment of best dispersibility for electrolytes is presented. Sixteen
              references: 13-USSR; 2-USA and 1-German (1910-1954). Graphs.

Institution : The D. I. Mendeleyev Chemical-Technological Institute, Moscow

Submitted   : April 9, 1953

GORBACHEV, S. V.

USSR/ Chemistry - Physical chemistry

Card 1/1   Pub. 147 - 16/27

Authors   : Gorbachev, S. V., and Vabel', Ya. I.

Title   : Potentiometric method of determining the irreversible naphthalin oxidation potential

Periodical : Zhur. fiz. khim. 28/9, 1662-1667, Sep 1954

Abstract   : A new objective (differential-potentiometric) method for the determination of oxidation potentials of irreversibly oxidizing substances, is introduced. The method was first used for measuring the potentials of a reversible system formed by the reduction-oxidation buffer present in the reaction mixture. The naphthalin oxidation potential was determined by the divergence of potentiometric titration curves plotted during the oxidation of the naphthalin with potassium permanganate with Fe-ions in the role of buffers. No foreign buffers were found to be needed during naphthalin oxidation with Ce-sulfate. The introduced method also makes it possible to determine the nature of the oxidation products. Six references: 3-USSR; and 3-USA (1927-1951). Graphs.

Institution : The D. I. Mendeleyev Chemical-Technological Institute, Moscow

Submitted : February 15, 1954

GORBACHEV, S. Y.

USSR/ Chemistry - Physical chemistry

Card 1/1   Pub. 147 - 23/27

Authors   :   Gorbachev, S. V.

Title   :   Regarding the problem of calculation of the concentrational and chemical
polarization as stated in the M. Smutek work

Periodical :   Zhur. fiz. khim. 28/9, 1684-1689, Sep 1954

Abstract   :   Critical review of the report by M. Smutek (1953), regarding the calculation
of concentrational and chemical polarization, is presented. The errors made
by Smutek in his report are listed, together with the necessary corrections.
Fourteen references: 13-USSR and 1-Czech (1945-1954).

Institution : The D. I. Mendeleyev Chemical-Technological Institute, Moscow

Submitted   : June 15, 1954

USSR/Chemistry - Dynamics

Card 1/1   Pub. 147 - 11/25

Authors   : Gorbachev, S. V., and Vabel', Ya. I.

Title   : Application of the potentiometric method to the study of kinetics of ir-
reversible oxidation of naphthalin in solution

Abstract   : The application of the potentiometric method, for the study of the kinetics
of naphthalin oxidation in an acetic acid solution and in an acid medium of
acidified H_2SO_4, is described. The method is based on the study of changes
in the oxidation-reduction potential of the reaction mixture. The oxidation
of naphthalin in an aqueous acetic acid solution with cerium sulfate takes
place as a bimolecular reaction with an activation energy of 14000 ± 500 cal.,
and the oxidation under identical conditions but with potassium permangan-
ate occurs as a self-accelerating reaction. The energy of activation of the
limiting phase was determined. A method was introduced for the determi-
nation of the energy barrier of an irreversible oxidation reaction. Seven
references: 4-USSR; 2-USA and 1-German (1905-1954). Table; graphs.

Institution : The D. I. Mendeleyev Chemical-Technological Institute, Moscow

USSR/ Chemistry - Electrodeposition

Card 1/1   Pub. 147 - 13/25

Authors   : Gorbachev, S. V., Vasenin, R. M.

Title   : The effect of lithium ions on the process of Cu electrodeposition

Periodical : Zhur. fiz. khim. 28/10, 1795-1803, Oct 1954

Abstract : The conversion of phase polarization into concentrational and chemical polarization was established experimentally during the study of cathodic polarization during Cu deposition in the presence of lithium ions. The effect of Li_2SO_4 concentrations and temperature on cathodic polarization, during Cu deposition in the presence of Li-ions, is explained. The dependence of the current density upon the concentration of the foreign electrolyte was investigated in the presence of Li-ions. The increase in the rate of the electrode process in the presence of Li ions was found to be connected with the structural changes in the hydrate shell of the reacting ion caused by the hydration of the foreign cations. Nine USSR references (1930-1954). Table; graphs.

Institution : The D. I. Mendeleyev Chemical-Technological Institute, Moscow

Submitted : February 21, 1954

GORBACHEV, S. V.

USSR/Scientists

Card 1/1   : Pub. 147 - 1/22

Authors   : Kudryavtsev, N. T., and Gorbachev, S. V.

Title   : About the scientific activities of N. A. Izgaryshev

Periodical   : Zhur. fiz. khim. 28/11, 1874-1877, November 1954

Abstract   : An eulogy is presented honoring the 70th birthday and 43rd year of active
                 pedagogical work of Professor of Physical Chemistry, academician, re-
                 cipient of Stalin premium, Nikolay Alekseevich Izgaryshev.

Institution   : .....

Submitted   : .....

GORBACHEV, S. V.

USSR/Chemistry - Physical chemistry

Card 1/1   :   Pub. 147 - 8/22

Authors   :   Vasenin, R. M., and Gorbachev, S. V.

Title   :   Effect of Na-ions on the Cu electrodeposition process

Periodical   :   Zhur. fiz. khim. 28/11, 1922-1927, November 1954

Abstract   :   A study of cathodic polarization during Cu deposition in the presence of
                  Na-ions revealed a smooth transformation of the phase polarization into
                  concentrational, followed by an increase in the applied potential. Results
                  obtained by adding a certain amount of Na-ions into the copper sulfate
                  solution are described. The relation between the increase in the rate of
                  the electrode process and the degree of Cu-ion hydration, which takes
                  place under the effect of secondary cation hydration, is explained. The
                  thermal dependence of viscosity and electrical conductivity of the solutions
                  was investigated and the results are tabulated. Six USSR references (1930-
                  1954). Table; graphs.

Institution   :   The D. I. Mendeleyev Chemical Technological Institute, Moscow

Submitted   :   February 21, 1954

GORBACHEV, S. V.

USSR/Chemistry - Physical chemistry

Card 1/1   : Pub. 147 - 9/22

Authors   : Gorbachev, S. V., and Vasonin, R. M.

Title   : Effect of Rb and Cs-ions on the Cu electrodeposition process

Periodical : Zhur. fiz. khim. 28/11, 1928-1934, November 1954

Abstract   : Experiments were conducted to determine the effect of Rb and Cs-ions on
the cathode process of Cu-deposition. The effect of Rb and Cs salt addi-
tion to the solution on the electrode polarization and current density is
explained. The increase in the effective activation energy, observed
during the increase in cesium sulfate concentration, reaches a maximum
only at low potentials and high addition-concentrations. The relation
between the secondary cation concentration, at which the rate of origi-
nation of metal crystallites is equal to the rate of feeding and dis-
charge of metal ions, and the nature of the secondary cation, is discussed.
Five USSR references (1943-1954). Tables; graphs.

Institution : The D. I. Mendeleyev Chemical Technological Institute, Moscow

Submitted   : February 21, 1954

USSR/Chemistry - Metallurgy

Card 1/2   :   Pub. 147 - 10/27

Authors   :   Vasenin, R. M., and Gorbachev, S. V.

Title   :   Effect of alkali-metal ions on the Cu electrodeposition process

Periodical   :   Zhur. fiz. khim. 28/12, 2156-2169, Dec 1954

Abstract   :   The factors which must be taken into consideration during the study of
the effect of foreign cations on the Cu electrodeposition process are
discussed. It was found that the attraction intensity of ions depends
upon their deformability in the electrical field of the electrode.
An increase in the ion electron polarization coefficient is followed
by an increase in the reaction energy between the ion and the metal
surface which in turn increases the cathode polarization and reduces
the current density. Foreign cations of greater hydration energy and
low polarization coefficient increase the rate of the electrode
process. It was established that the effective activiation energy of

Zhur. fiz. khim. 28/12, 2156-2169, Dec 1954   (Additional Card)

Card 2/2

Abstract   :   concentrational polarization is the linear function of the electron
polarization coefficient which in turn depends upon the polariz-
ability of the foreign cation. Twenty-two USSR references (1930-1954).
Tables; graphs

Institution :   The D. I. Mendeleyev Chemical-Technological Institute

Submitted   :   February 21, 1954

USSR/Chemistry - Book review

Card 1/1   : Pub. 147 - 20/27

Authors   : Kulikov, F. S.

Title   : Regarding the report by S. V. Gorbachev and E. Ya. Mindovich entitled, "Distribution of Picric Acid", Parts 1 and 2

Periodical   : Zhur. fiz. khim. 28/12, 2232-2233, Dec 1954

Abstract   : Critical review is presented on the report by S. V. Gorbachev and E. Ya. Mindovich entitled, "Distribution of Picric Acid". The critic points out the errors in the report and explains that the errors originated because the authors applied the Boltzmann distribution law which is inapplicable in such a case instead of the Berthellet law which is best suited for such problems. Five references ; 1 French; 3 USSR and 1 German (1870-1953).

Institution : ....

Submitted   : March 26, 1954

GORBACHEV, S. V.

USSR/ Chemistry - Physical chemistry

Card 1/1   Pub. 147 - 2/26

Authors   :   Gorbachev, S. V., and Vabel', Ya. I.

Title   :   The kinetics of electrochemical oxidation of naphthalin in an
                  acetate solution

Periodical   :   Zhur. fiz. khim. 20/1, 15-22, Jan 1955

Abstract   :   The electrochemical kinetics of naphthalin oxidation was investigated
                  over a wide temperature range (20-80) by the polarization curve method.
                  The two consecutive processes accompanying naphthalin oxidation over
                  a Pt-anode are described.

Institution: The D. I. Mendeleyev Chemical-Technological Institute, Moscow

Submitted :   February 15, 1954

Periodical :   Zhur. fiz. khim. 20/1, 15-22, Jan 1955

Card 1/1   Pub. 147 - 2/26

Abstract :   The first process was found to be limited by the direct reaction of
                  the naphthalin molecule with the Pt-anode and the second one by the
                  diffusion of the molecules of the naphthalin oxidation product. The
                  directly proportional dependence of the current density upon the
                  concentration of the reagent was accepted as an indication that the
                  electrolysis process is perfectly identical to ordinary chemical
                  reactions. Five USSR references (1948-1954). Graphs.

GORBACHEV, S.V.; VABEL', Ya.I.

    Kinetics of electrochemical oxidation of naphthalene in a solution of acetic acid. Zhur.fiz.khim. 29 no.1:15-22 Ja '55.   (MLRA 8:7)

    1. Khimiko-tekhnologicheskiy institut imeni D.I. Mendeleyeva, Moscow.
      (Naphthalene) (Oxidation)

GORBACHEV, S.V.; VABEL', Ya.I.

Kinetics of electrochemical oxidation of α-naphthoquinone and of its mixtures with naphthalene. Zhur.fiz.khim. 29 no.1:23-27 Ja '55.

(MIRA 8:7)

1. Khimiko-tekhnologicheskiy institut imeni D.I. Mendeleyeva, Moscow.
(Naphthoquinone) (Naphthalene) (Oxidation)

GORBACHEV, S.V.; KUDRYASHOV, I.V.

Relation of partial pressures of components in the system: toluene-
-2,2,4-trimethylpentane to composition and temperature. Zhur.fiz.
khim. 29 no.4:589-596 Ap '55.   (MIRA 8:8)

1. Khimiko-tekhnologicheskiy institut im. D.I. Mendeleyeva, Moskva.
   (Vapor pressure) (Toluene) (Pentane)

Gorbachev, S U

the state of the arts

SHLYKOV, A.V.; GORBACHEV, S.V.

Influence of the rate of cooling on ultimate supersaturation.
Zhur.fiz.khim. 29 no.6:1027-1030 Je '55.   (MLRA 9:1)

1.Metallurgicheskiy institut g.Zhdanov, Khimiko-tekhnologicheskiy
institut imeni D.I.Mendeleyeva, Moscow.
          (Solutions, Supersaturated)

GORBACHEV, S.V.

USSR/Physical Chemistry - Thermodynamics. Thermochemistry. Equilibrium.
Physicochemical Analysis. Phase Transitions, B-8

Author: Gorbachev, S. V., Shlykov, A. V.

Institution: None

Title: Dependence of Limit Oversaturation of Salts on Temperature and Stability of Solutions

Abstract: Determined was the magnitude of oversaturation ΔC for aqueous solutions of the salts KNO_3, KCl, KBr, K_2SO_4, $K_2Cr_2O_7$, $KBrO_3$, KIO_3 and $Cu(NO_3)_2 \cdot 3H_2O$ at different temperatures. It was found that in the case of spontaneous crystallization of salts from their oversaturated solutions the mean maximum overcooling is a constant quantity with given conditions of cooling. Relative limiting oversaturation of solutions of KNO_3, KCl, KBr, $K_2Cr_2O_7$, K_2SO_4, $KBrO_3$ and KIO_3 decreases with increasing temperature du...

Card 1/

USSR/Physical Chemistry - Thermodynamics. Thermochemistry. Equilibrium.
Physicochemical Analysis. Phase Transitions, B-8

Abstract: to greater increase in solubility of the salt as compared with the increase in limiting concentration. In the case of $KBrO_3$ crystallization of oversaturated solutions takes place within the interval $5.9°-6.5°$ and no sharply defined metastability limit could be detected for them. Solutions of $Cu(NO_3)_2 \cdot 3H_2O$ do not crystallize down to $-10°$; solution of a salt containing 1-2% H_2O was held at $-10°$ for 2 months without showing any signs of crystallization. The authors assume that experimental material concerning the stability of supersaturated solutions of salts having a concentration close to the limiting is contrary to the views which consider oversaturated solutions as being microheterogeneous systems. The process of crystallization occurs in those instances when the fluctuatively arising grouping of particles of dissolved salt of definite dimension becomes stable. Such a grouping can be not rigorously crystalline. If removal of energy from the fluctuative grouping occurs at a high rate the phase thus formed can be of amorphous or latent-crystalline nature. For KNO_3 and KBr was measured the dependence of the time of beginning of crystallization on the

Card 2/3

GORBACHEV, S.V.

Category : USSR/Solid State Physics - Morphology of Crystals,   E-7
          Crystallization

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6697

Author   : Gorbachev, S.V., Shlykov, A.V.
Title   : Concerning the Surface Tension of the Crystalline Nucleus
           in a Solution,

Orig Pub : Zh. fiz. khimii, 1955, 29, No 10, 1777-1783

Abstract : The authors believe that the equations used to estimate the
           surface tension σ on the boundary between the crystalline
           nucleus and the melt (or solution) and connecting the speed
           of production of nuclei with the degree of supercooling or
           supersaturation (Volmer M., Weber, A., Z. phys. Chem., 1926,
           119, 227, Frenkel, Ya.I., Kinetic Theory of Liquids, 1945, 236)
           are not sufficiently well grounded, for in their derivation
           no account has been taken of the following facts: 1) the
           formation of the new phase in the form of nuclei is essen-
           tially a non-isothermal process; 2) the second law of
           thermodynamics cannot be applied to nuclei measuring approx-
           imately 10^{-6} cm; 3) supersaturated solutions cannot be
Card   : 1/2

USSR/Physical Chemistry. Electrochemistry.

Authors : S. V. Gorbachev, Yurkevich, Yu. N.
Inst : Not given D. I. MENDELEEV CHEM-TECHNOL. INST, MOSCOW.
Title : Polarization of Nickel Electric Crystallization from Solutions NiCl2 in Aqueous-Alcoholic Mixtures.

Orig Pub : Zh. fiz. khimii, 1956, 30, No 4, 922-927.

Abstract : By method described before (RZh Khim.,1955,7221), at the temperature range of 20-90°, the kinetics of cathodic processes on Ni-electrode in glycol, aqueous-glycol, aqueous glycerin, and aqueous glucose solutions of 0.1 Ml NiCl2 and 0.1 Ml KCl were studied. On the basis of polarization curves (PC) (I, Δ E) analysis, some peculiarities of studied cathodic processes are noted namely: presence of maximum currents in NiCl2 glycol solutions; analogy of hydrogen producing kinetics in aqueous and aqueous-glycol solutions containing KCl; the complex character of polarization potential Δ E dependence on glycol or glycerin contents in NiCl2 aqueous-alcoholic solutions, Δ E for aqueous-glycerin solutions at all temperatures grows at first with the

Card 1/2

USSR/Physical Chemistry. Electrochemistry.

increase of glycerin contents, attains its maximum at 25% glycerin contents and then diminishes and after attaining its minimum grows anew. The authors come to the conclusion that the amount and character of polarization at electric crystallization of Ni from aqueous-alcoholic mixtures depend strongly on mixture composition.

Card 2/2

GORBACHEV, S.V.

Theory of concentration polarization. Zhur.fiz.khim.30 no.5:1151-1157
My '56.
(MLRA 9:9)

1.Khimiko-tekhnologicheskiy institut imeni D.I.Mendeleyeva, Moskva.
        (Polarization (Electricity)

Category: USSR/Physical Chemistry--Solutions. Theory of acids and B-11
           bases.

Abs Jour: Referat Zhur--Khimiya, No 3, 1957, 7639

Author : Gorbachev, S. V. and Grabova, Ye. I.
Inst   : Not given D, I. MENDELEEV CHEM - TECHNOL. INST., Moscow.
Title   : A refractometric Method for the Investigation of Diffusion Processes
           and Its Application to the Study of Diffusive Solution

Orig Pub: Zh. Fiz. Khimii, 1956, Vol 30, No 6, 1228-1237 (English summary)

Abstract: A new refractometric method is proposed for the investiation of
           diffusion processes. The method makes it possible to determine
           the distribution of the diffusing substance in a liquid layer up to
           10 cm thick; using the index of refraction. The main element of
           the apparatus is a cuvette, one of the walls of which forms a side
           of a completely reflecting prism. The accuracy of the determina-
           tion is $\sim 10^{-4}$. The method offers the advantage of studying diffu-

Card   : 1/2
                                    -1-

sion processes over a wide range of concentrations. The method
has been applied to the investigation of the kinetics of the solution
of $CuSO_4$ in H_2O. A comparison has been made of the experimental
data with a theoretical calculation of the diffusion of the solute par-
ticles without taking into account convection. The theoretical results
can be brought into good agreement with experimental data by the
use of averaged refraction coefficients.

Card   : 2/2
                                    -2-

Calculation of the concentration polarization in the non-stationary regime of electrolysis   S. V. Gorbachev (D. I. Mendeleev...

...nite c or a definite dc/dx at the electrode is not made, but Faraday's laws are used...

GORBACHEV, S. V.

USSR/Physical Chemistry. Electrochemistry.

B-12

Abs Jour : Ref Zhur - Khimiya, No 7,1957, 22498.

Author   : S. V. Gorbachev, Yu. N. Yurkovich.
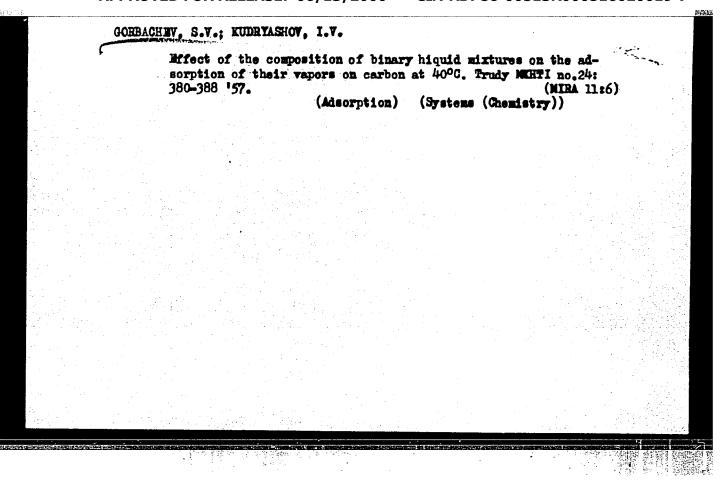Inst   : Not given D. I. Mendeleev Chem-Technol. Inst, Moscow.
Title   : Combination of concentration, chemical and phase polarisations

Orig Pub : Zh. fiz. khimii, 1956, 30, No 8, 1880-1882.

Abstract : In development of works published before (Gorbachev S. V. Zh.
           fiz. khimii, 1950, 20. 888, 1952, 26, 1303) an equation is of-
           fered, which, in opinion of authors, is applicable for the des-
           cription of electric crystallization of metal kinetics in con-
           ditions of a combination of concentrations of chemical and
           phase polarization.

Card 1/1

GORBACHEV, S.V.; KUDRYASHOV, I.V.

Effect of the composition of binary hiquid mixtures on the ad-
sorption of their vapors on carbon at 40°C. Trudy MKHTI no.24:
380-388 '57.   (MIRA 11:6)
(Adsorption)   (Systems (Chemistry))

GORBACHEV, S.V.; KHACHATURYAN, M.G.

In memory of N.A. Izgaryshev.   Zhur.fiz.khim. 31 no.4:928-931
Ap '57.   (MIRA 10:7)
            (Izgaryshev, Nikolai Alekseevich, 1884-1956)

AUTHOR: Gorbachev, S.V., Khachaturiyan, O.B.   76-11-23/35

TITLE: The Dependence of the Velocity of Electrolysis on the Composition
            of Reversible Redox Systems (Zavisimost' skorosti elektroliza ot
            sostava obratimykh okislitel'no-vosstanovitel'nykh sistem)

PERIODICAL: Zhurnal Fisicheskoy Khimii, 1957, Vol. 31, Nr 11, pp. 2526-2533
            (USSR)

ABSTRACT: The system ferro-, ferricyanides was investigated. The method em-
            ployed was that of the temperature dependence of current density
            on the polarization potential, which was used in a number of works
            (e.g. Ref.6-10). The investigation of the kinetics of the electro-
            chemical reaction oxidation of ferro-, ferricyanides shows that
            with a concentration of 0.1 and 0.3 M and 25, 40, 60 and 80° C the
            velocity of the process concerned is limited by the concentration
            polarization. An equation is derived with the help of which it is
            possible to compute the dependence of amperage on composition in the
            case of any polarization potential for reversible redox systems.
            There are 8 figures and 12 references, 8 of which are Slavic.

Card 1/2

76-11-23/35

The Dependence of the Velocity of Electrolysis on the Composition of Reversible Redox Systems

ASSOCIATION: Chemical-Technological Institute imeni D.I.Mendeleyev (Khimiko-tekhnologicheskiy institut im. D.I.Mendeleyeva)

SUBMITTED: September 5, 1956

AVAILABLE: Library of Congress

Card 2/2

AUTHORS: Gorbachev, S. V., Mil'chev, V. A.   SOV/156-58-1-5/46

TITLE: The Electrolysis of the Reversible Oxidative-Reductive System
              up to a Temperature of 200°C (Elektroliz obratimoy okislitel'no-
              vosstanovitel'noy sistemy do temperatury 200°C)

ABSTRACT: The temperature method of investigating the kinetics of
              electrochemical processes is more and more used. The experiments
              are, however, usually limited to the range of 20 - 80°C. Data
              on the electrolysis at more than 100° are therefore almost
              completely lacking. In the present paper the rules governing
              the temperature-kinetic method at higher temperatures were to
              be rechecked. A system of the ferri- and ferrosulfates
              (solution 1 : 1) was subjected as redox system to an electro-
              lysis in several molar concentrations at platinum electrodes.
              A thermostatic autoclave served for this purpose. Figures 1
              and 2 show the obtained cathode and anode polarization curves
              distanced by 20° between 20 and 200°C. A reduction of polari-
              zation and a rapid increase of the boundary of the applicable
              current densities were observed with rising temperature. The

Card 1/3

The Electrolysis of the Reversible Oxidative-Reductive   SOV/156-58-1-5/46
System up to a Temperature of 200 °C

given dependence $\lg i - i/T$ of the cathode process at different
potentials (Fig 3) up to the limit current (dotted line)
confirms the general rules governing the temperature-kinetic
method. A similar dependence applies also in the case of the
anode process. Figure 4 shows the calculated values of A_{ef}
with increasing polarization. The constancy of the quantity
A_{ef} during the polarization speaks in favor of the fact that
a concentration polarization takes place in the given
electrochemical cathode and anode processes. A_{ef} amounts for
the cathode process to 3550 kcal/mol and correspondingly A_{ef}
of the anode process to 3110 kcal/mol. There are 4 figures and
3 references, 2 of which are Soviet.

ASSOCIATION: Kafedra fizicheskoy khimii Moskovskogo khimiko-tekhnologiches-
kogo instituta im.D.I.Mendeleyeva (Chair of Physical Chemistry
of the Moscow Institute of Chemical Technology imeni
D.I. Mendeleyev)

Card 2/3

The Electrolysis of the Reversible Oxidative-Reductive   SOV/156-58-1-5/46
System up to a Temperature of 200°C.

SUBMITTED: September 23, 1957

Card 3/3

AUTHORS: Khachaturyan, O. B., Gorbachev, S. V.   SOV/156-58-1-6/46

TITLE: The Polarization of Reversible Oxidative-Reductive Systems (Polyarizatsiya obratimykh okislitel'no-vosstanovitel'nykh sistem) Ferro-Ferri Ions (Ferro-ferriiony)

PERIODICAL: Nauchnyye doklady vysshey shkoly, Khimiya i khimicheskaya tekhnologiya, 1958, Nr 1, pp. 19 - 22 (USSR)

ABSTRACT: In spite of a great number of papers on the kinetics of the electrochemical oxidation and reduction of the iron ions in solutions a uniform point of view concerning the nature of the polarization which accompanies this process has hitherto been lacking. This is shown by a survey of publications(Refs 1-6) according to which the nature of the overcharging process of the iron ions is not finally explained. Therefore the authors investigated its kinetics in sulfuric acid solutions under application of the temperature-kinetic method (Ref 9). In this connection the mechanism of the most retarded stage which determines the velocity of the whole process may be determined reliably only if the following three factors are investigated:

Card 1/4   a) The absolute value of the effective activation energy,

The Polarization of Reversible Oxidative-Reductive   SOV/156-58-1-6/46
Systems. Ferro-Ferri Ions

b)its dependence on the polarization potential, and c) the
influence of stirring on the velocity of the proceeding process.
Solutions of bi- and trivalent iron sulfate in 0,1 n.sulfuric
acid were investigated. Figure 1 shows curves which were plotted
for 0,1 M solution in a not stirred electrolyte at 20 - 80°C.
The curves increase rapidly with rising temperature and the
polarization is reduced. The imperfect symmetry of the anode-
and cathode curves points out that the anode process is lagging
behind the cathode process. It was found that the curves of
the current density logarithm versus the inverse temperature
function in a wide range represent parallel straight lines
(Fig 2). On the strength of the obtained polythermal curves
the amount of the effective activation energy (Ref 9) of the
cathode- and anode process was calculated for all investigated
concentrations. It fluctuated between 6 and 7 kcal/mol. Since
stirring is a criterion which suggests a diffusion nature of
the process, its influence was investigated. Figure 3 shows
that the stirring of the electrolytes reduces to a great extent
the polarization and increases the current density. The values
Card 2/4   of the activation energy were in this case not equal to the

The Polarization of Reversible Oxidative-Reductive   SOV/156-58-1-6/46
Systems. Ferro-Ferri Ions

last mentioned. It was found that also a prototropiad (proto-
tropnyy) mechaniam takes place beside the ionic conductivity.
Thus an occurrence may be assumed of a hydrolysis in the
sulfate iron solutions which leads to the formation of the
colloidal iron hydroxide. The latter was proved as well. The
iron hydroxide plays the rôle of a surface-active addition
in the solution. The existence of the latter causes an in-
creased value of the amount of the effective activation energy
(Ref 10). There are 3 figures and 10 references, 3 of which
are Soviet.

ASSOCIATION: Kafedra fizicheskoy khimii Moskovskogo khimiko-tekhnologiches-
kogo instituta im.D.I.Mendeleyeva (Chair of Physical Chemistry
of the Moscow Institute of Chemical Technology imeni
D.I. Mendeleyev)

SUBMITTED: September 12, 1957

Card 3/4

5(4)   SOV/153-58-2-18/30
AUTHORS: Khachaturyan, O. B., Gorbachev, S. V.

TITLE: Electrochemical Kinetics of Some Reversible Redox Systems
                  (Elektrokhimicheskaya kinetika nekotorykh obratimykh
                  okislitel'no-vosstanovitel'nykh sistem)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya
                  tekhnologiya, 1958, Nr 2, pp 106-113 (USSR)

ABSTRACT: The reversible systems have a particular position among the
                  various electrochemical processes. The number of the different
                  elementary stages which are responsible for the occurrence of
                  polarization is here the least. Therefore, quite recently, the
                  investigators have taken much interest in redox systems espe-
                  cially in such typical cases as ferro-ferricyanides (Ref 1)
                  and others (Refs 2-6). In these studies, however, the influence
                  exercised by the composition of these systems upon the rate of
                  the electrochemical reaction is scarcely being considered. Even
                  in those papers where this was done (Refs 5-8), no conclusions
                  with respect to the rate of electrolysis were drawn. The au-
                  thors investigated the problem under review for systems of the
Card 1/4   ferro-ferricyanides and of simple iron salts. The method of

Electrochemical Kinetics of Some Reversible Redox Systems

measurement and the equipment were already previously describ-
ed (Ref 11). Diagrams of the "electrochemical activity" on the
basis of the isotherms of the dependence of the electrolysis
rate upon the polarization potential (Fig 1) were studied.
These measurements were carried out for various relations of
oxidized and reduced ions at 20°, 60°, and 80° with a total
concentration of the solution of 0.1 M. Neutral salts of ferro-
ferricyanides and iron sulfates in a 0.1 N sulfuric acid were
tested. As it can be seen in figures 2 and 3, the isopotential
curves of the dependence of the electrolysis rate on the com-
position of the system pass through a maximum. This maximum is
shifted with the increasing polarization potential and with the
change of the composition of the solution. This shift is char-
acteristic both of anodic and cathodic processes. The investi-
gation of the systems (Refs 11,12) shows that the above rules
remain valid for all concentrations (up to the saturated solu-
tions) and for all temperatures investigated. From this it may
be concluded that the rule detected is not determined by the
individual properties of the system investigated, but apparent-
Card 2/4   ly by the most retarded stage of the process. This stage pos-

Electrochemical Kinetics of Some Reversible Redox Systems

SOV/153-58-2-18/30

sesses a diffusion nature. Starting from this it was tried to calculate the curves obtained. After various computations the authors establish the equation (6), from which can be seen that the position of the maximum on the curve is determined by the total concentration, the polarization potential and temperature. If the equation (6) is applied to the description of the experimental data regarding ferro-ferri ions, only the character of the rule observed can be determined. The maximum of the corresponding curves remains below the maximum computed and the rate of the process is considerably reduced as compared with its calculated value (Fig 4). Finally, the determination and dependence of the coefficient μ (equation 4) (Tables 1,2) are discussed. Thus the authors proved that in a system consisting of ferro-ferri-sulfates quantitative deviations from the values computed by equation (6) are observed. They are explained by adsorption of the colloidal iron hydroxide on the electrodes. There are 4 figures, 2 tables, and 18 references, 10 of which are Soviet.

Card 3/4

SOV/153-58-2-18/30

Electrochemical Kinetics of Some Reversible Redox Systems

ASSOCIATION: Moskovskiy khimiko-tekhnologicheskiy institut imeni D. I.
               Mendeleyeva (Moscow Institute of Chemical Technology imeni
               D. I. Mendeleyev)
               Kafedra fizicheskoy khimii (Chair of Physical Chemistry)

SUBMITTED: September 23, 1957

Card 4/4

AUTHORS: Mil'chev, V. A., Gorbachev, S.V.   SOV/156-58-2-9/48

TITLE: Electric Conductivity of Aqueous Solutions of K_2SO_4, Li_2SO_4,
              $ZnSO_4$ and $CdSO_4$ at High Temperatures (Elektroprovodnost'
              vodnykh rastvorov K_2SO_4, Li_2SO_4, $ZnSO_4$, $CdSO_4$ pri vysokikh
              temperaturakh)

ABSTRACT: Theoretical investigations of the problem mentioned in the
              title are of high interest and attract increasing interest.
              However, data on this subject are very sparsely. (Refs 1-4).
              The authors' investigations were carried out in an autoclave
              with an electric wiring according to a simple measuring
              method which was described giving full particulars (Refs 5, 6).
              The diagram in figure 1 shows the dependence of the specific
              electric conductivity ($\varkappa$) of K_2SO_4 and Li_2SO_4 on the tempera-
              ture. Henceforth it can be seen that a mounting temperature
              and a rising concentration result in a considerably mounting
              value of $\varkappa$. At least no maximum can be seen in the curves.
              Furthermore it appears from the diagram that the increase of $\varkappa$
Card 1/3   at an increasing temperature exceeds the increase due to an

Electric Conductivity of Aqueous Solutions of K_2SO_4, Li_2SO_4, $ZnSO_4$ and $CdSO_4$ at High Temperatures

increase in concentration. An analogous dependence on temperature exists for solutions of $ZnSO_4$ and $CdSO_4$ (Fig 2). The presence of maxima in the range of 100-113°is characteristic of bivalent metals. Apparently univalent metals reach their maxima at much higher temperatures (Ref 3). As is known trivalent metals reach the maxima of electric conductivity at temperatures of 60°. As is well known the change of $\varkappa$ is correlated with the temperature together with the appearance of maxima, with the change of viscosity of the solution and with the **dielectric** constant on the one hand as well as with the radius of the atmosphere and the relaxation time on the other. There are 2 figures and 6 references, 3 of which are Soviet.

ASSOCIATION: Kafedra fizicheskoy khimii Moskovskogo khimiko-tekhnologichesko-go instituta im. D. I. Mendeleyeva
(Chair of Physical Chemistry of the Moscow Chemical and Technical Institute imeni D. I. Mendeleyev)

Card 2/3

5(4)

AUTHORS: Gorbachev, S. V., Atanasyants, A. G.   SOV/153-58-3-21/30

TITLE: Effect of the Concentration of the Electrolyte on the
                Cathodic and Anodic Polarization of Zinc and Cadmium
                (Vliyaniye kontsentratsii elektrolita na katodnuyu i
                anodnuyu polyarizatsiyu tsinka i kadmiya)

ABSTRACT: The electrode processes differ from ordinary hetero-
                geneous chemical processes in the fact that their
                activation is not only caused by molecular collisions
                due to thermal motion but also by means of the energy
                of the electric field. In this respect the concepts
                taken from the usual chemical kinetics proved to be
                insufficient as they do not take into account the
                specific character of electrochemical reactions.
                A survey of publications (by far not complete, as the
                authors believe) is given (Refs 1-16). The velocity
                of the anodic dissolution of a metal is not allowed
Card 1/4   to depend on the ion concentration of this metal in

Effect of the Concentration of the Electrolyte on the   SOV/153-58-3-21/30
Cathodic and Anodic Polarization of Zinc and Cadmium

the solution, and in no way can depend on the nature
of the anion, starting from kinetic rules (Refs 8,9).
Nevertheless, there exists such a dependence
(Refs 10-12). It may be seen from the survey of
literature mentioned that no definite character
of the dependence can be found in the experimental
results although the velocity of the cathodic and
anodic processes depends on the concentration of the
substances. In spite of the great importance of
this problem there are no systematic investigations
mentioned in publications dealing with this problem.
The authors investigated the dependence of the current
density on the concentration at certain polarization
potentials for the electrodeposition and the electro-
lytic solution of zinc cadmium in the solutions of
their salts. Their sulfates within a wide concentration
range from 2.10^{-3}M to 2M were used for this purpose.
The polarization was investigated by means of the
Card 2/4   compensation method and Yagramyan's method. It was

Effect of the Concentration of the Electrolyte on the   SOV/153-58-3-21/30
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> found that the character of the rules (independent
> of the method of investigation) is maintained for
> zinc as well as for cadmium. The velocity of the
> cathodic and anodic processes for zinc and cadmium
> increases monotonously with the increasing concentration
> of the electrolyte at a constant polarization potential
> between 20 and 80°, and is proportional to the con-
> centration with one fractional exponent. The experiments
> on the electrolysis where convection currents near
> the electrodes were suppressed, showed that the
> character of the dependence of the velocity of the
> electrode processes on the concentration remains
> the same as under the conditions of a natural con-
> vection. Professor A.T.Vagramyan made the rapid
> measurements in his laboratory possible. A.P.Popkov
> took part in the measurements and their evaluation.
> There are 10 figures, 1 table and 17 references, 9 of
> which are Soviet.

Card 3/4

Effect of the Concentration of the Electrolyte on the   SOV/153-58-3-21/30
Cathodic and Anodic Polarization of Zinc and Cadmium

ASSOCIATION: Moskovskiy khimiko-tekhnologicheskiy institut imeni
              D.I.Mendeleyeva (Moscow Institute of Chemical Technology
              imeni D.I.Mendeleyev)Kafedra fizicheskoy khimii (Chair
              of Physical Chemistry)

SUBMITTED: October 4, 1957

Card 4/4

AUTHORS: Gorbachev, S. V., Atanasyants, A. G.   SOV/156-58-3-7/52

TITLE: The Effect of the Concentration on the Velocity of the Electrolytic Precipitation and Dissolution of Zinc and Cadmium in Sulfate Solutions of These Metals (Vliyaniye kontsentratsii na skorost' elektroosazhdeniya i elektrorastvoreniya tsinka i kadmiya v rastvorakh sul'fatov etikh metallov)

PERIODICAL: Nauchnyye doklady vysshey shkoly, Khimiya i khimicheskaya tekhnologiya, 1958, Nr 3, pp. 430 - 434 (USSR)

ABSTRACT: The cathodic and anodic polarization of zinc and cadmium were investigated over a wide range of concentrations of the corresponding sulfates by means of the compensation method and the method suggested by Vagramyan. On this occasion it was found that the cathodic and anodic polarizations decrease with increasing concentration.

Furthermore, the authors investigated the velocity of the separation and dissolution of zinc and cadmium in relation to the concentration of the single "neutral" salts (the sulfates) of the corresponding metals. The investigations were carried out at a constant polarization potential within the temperature interval of $20^{\circ} - 80^{\circ}$; they showed that the velocity of the

Card 1/3

The Effect of the Concentration on the Velocity of   SOV/156.-58-3-7/52
the Electrolytic Precipitation and Dissolution of Zinc and Cadmium in
Sulfate Solutions of These Metals

two mentioned processes increases monotonously with the
increasing concentration of the solution, viz., proportional
to the concentration of the dissolved salt.
The experimental results obtained are given in diagrams. They
show: the influence of the concentration of $ZnSO_4$ (Diagram 1)
and $CdSO_4$ (Diagram 2) on the cathodic and anodic polarizations
of zinc and cadmium at 20°; the dependence of the velocity
of the dissolution and separation of zinc (Diagram 3) and
cadmium (Diagram 4) on the concentration of $ZnSO_4$ and $CdSO_4$
at polarization potentials of 40 mV, 120 mV, 200 mV and 360
mV. $I = k \cdot C^n$ ($\Delta\varphi$ = const, T = const) holds for the reaction
velocity, where I denotes the reaction velocity (current density),
C the concentration of the (reacting) initial substances, $\Delta\varphi$ the
polarization potential, T the temperature, k the (velocity)
constant (dependent on temperature), n the order of reaction.
The n-values for zinc and cadmium sulfate solutions are given
in a table. There are 4 figures, 1 table, and 20 references,
12 of which are Soviet.

Card 2/3

The Effect of the Concentration on the Velocity of   SOV/156-58-3-7/52
the Electrolytic Precipitation and Dissolution of Zinc and Cadmium in
Sulfate Solutions of These Metals

ASSOCIATION: Kafedra Fizicheskoy khimii Moskovskogo khimiko-
          tekhnologicneskogo instituta im.D.I.Mendeleyeva (Chair of
          Physical Chemistry of the Moscow Chemical and Technological
          Institute im.D.I.Mendeleyev)

SUBMITTED: December 14, 1957

Card 3/3

GORBACHEV, S.V.

76-1-28/32

AUTHORS: **Gorbachev,** S. V. , Gusev, N. I.

TITLE: The Effect of the Form and the Size of an Electrode Surface on the
               Polarization in the Anodic Dissolution of Copper (Vliyaniye formy
               i velichiny poverkhnosti elektroda na polyarizatsiyu pri anodnom ra-
               stvorenii medi)

ABSTRACT: For the purpose of clarifying three questions measurements were
               carried out here. 1.) What is the effect of the electrode form with
               unchanged surface of the electrode on the value of the anodic pola-
               rization under otherwise equal conditions (constant current density
               and temperature). 2.) What is the effect of the size of the elec-
               trode surface with an equal form of the electrode on the value of
               the anodic polarization under otherwise equal conditions (constant
               current density and temperature). 3.) Character and degree of this
               effect in the case of a concentration- and chemical polarization.
               All measurements were carried out in two electrolytes at 20°C: 0,05
               M $CuSO_4 \cdot 5H_2O$ and 0,05 M $CuSO_4 \cdot 5H_2O$ + 4 M H_2SO_4. The anodic process
               was investigated. The measurements show above all that the effect
               of the convection processes are quite different in the case of a
Card 1/3   concentration- and of a chemical polarization. At the chemical po-

75-1-28/32

The Effect of the Form and the Size of an Electrode Surface on the Polarization
in the Anodic Dissolution of Copper

lari...tion. At the chemical polarization the effect of the convec-
tion is very unimportant and, with some approximation, it   may
be assumed to be negligible. On the contrary, at a limited value
of the concentration polarization with an unchanged current density
the convection processes displace the polarization by hundreds of
millivolts. On a comparison of the three kinds of electrodes - ver-
tical bar, vertical plate and horizontal spiral it appears that the
greatest polarization is observed at the horizontal spiral. It is
shown that the lengthening of the wire has different effects in
the case of a vertical bar or a plain horizontal spiral. In the
first case the lengthening of the wire at constant current density
causes the increase of the polarization. The more concentrated
$CuSO_4$ solution produced on occasion of the anodic dissolution of
the copper electrode in a way covers the electrode with a shield
of increased concentration. In the second case, at the horizontal
plain spiral the convection current does not displace the range of
the increased $CuSO_4$ concentrations along the electrode surface, but
from the electrode downward into the more concentrated parts of
the solution. The increase of the spiral surface with unchanged
current density signifies an increase of the current intensity and
Card 2/3   an increase of the intensity of the anodic dissolution. The latter

The Effect of the Form and the Size of an Electrode Surface on the Polarization
in the Anodic Dissolution of Copper

76-1-26/32

one, for its part, decreases the size of polarization. There are
5 figures, and 6 references, 4 of which are Slavic.

ASSOCIATION: Chemical Technological Institute imeni D. I. Mendeleyev
(Khimiko-tekhnologicheskiy institut im. D. I. Mendeleyeva)

SUBMITTED: January 17, 1957

AVAILABLE: Library of Congress

Card 3/3

AUTHORS: Gorbachev, S. V., Gusev, N. I.   76-32-2-21/38

TITLE: The Application of the Dual Electrode Method for the Differentia-
                tion Between Concentration- and Chemical Polarization
                (Primeneniye metoda dvukh elektrodov dlya razlicheniya
                kontsentratsionnoy i khimicheskoy polyarizatsii)

ABSTRACT: The authors investigated the polarization in the dissolution of
                copper at the anode of a $CuSO_4$. $5H_2O$-solution as well as in a
                solution of the same salt with a strong addition of sulfuric acid.
                The measurement of the polarization curve was carried out in two
                experiments at the same temperature and with electrodes of the
                same material. In one experiment the operation electrode was for-
                med like a flat spiral with few windings in the horizontal plane
                vertical to the lines of current. In the other experiment the elec-
                trode was a flat platelet situated in a vertical plane also at right
                angles to the flow pattern. The polarization measurements were
Card 1/3   carried out in 0,05 M $CuSO_4$.$5H_2O$-solutions and in 0,05 M $CuSO_4$.$5H_2O$

The Application of the Dual Electrode Method for the   76-32-2-21/38
Differentiation Between Concentration- and Chemical
Polarization

+ 4M H_2SO_4-solutions. From the polarization curves obtained it
can be seen that anode polarization very strongly depends on the
temperature. With a rise of temperature the anode polarization
decreases in the electrolyte only containing copper sulfate as
well as in an electrolyte with $CuSO_4$ and free sulfuric acid. For
the determination of the nature of the anode polarization in the
dissolution of copper the method of temperature influence on the
velocity of electrolysis was applied (references 1-5). A compari-
son of the results of measurements with different anodes shows
that great quantitative differences of the polarization values
occur in concentration polarization. In chemical polarization, how-
ever, the polarization is within the limits of error, the same in
the case of the horizontally situated spiral anode as well as in
the case of the vertically situated platelet anode. These facts
are explained by the authors as follows. In the case of the plate-
let anode important convection currents are formed in the liquid.
The intensive convection currents at the anode lead to a quick
Card 2/3   regeneration of the solution and therefore cause a decrease of

The Application of the Dual Electrode Method for the   76-32-2-21/38
Differentiation Between Concentration- and Chemical
Polarization

polarization. In the case of the spiral anode, however, the
convection currents in the liquid are very small. This leads
to a slow regeneration of the solution at the electrode and
thus to an increase of polarization. Summarizing, it is stated
that by using two different electrodes- the horizontally arranged
spiral and the vertically arranged platelet- it is possible to
determine the character of polarization and to differentiate the
concentration polarization from chemical polarization.
There are 8 figures, and 7 references, which are Slavic.

ASSOCIATION: Institute for Chemical Technology imeni D. I. Mendeleyev, Moscow
               (Khimiko-tekhnologicheskiy-institut im. D. I. Mendeleyeva, Moskva)

SUBMITTED: November 14, 1956.

AVAILABLE: 1. Anodes (Electrolytic)--Polarization   2. Polarization--Measurement
               3. Electrolysis--Temperature factors
Card 3/3

AUTHORS: Chzhou Shao-Min', Gorbachev S. V.   76.32.3.21/43

TITLE: An Investigation of the Kinetics of the Oxidation of
Alcohols in Solutions (Issledovaniye kinetiki okisle=
niya spirtov v rastvore)
I. The Kinetics of the Oxidation of Alcohols With
Potassium Permanganate and Cerium Sulfate (I. Kinetika
okisleniya spirtov permanganatom kaliya i sernckislym
tseriyem)

PERIODICAL: Zhurnal Fizicheskoy Khimii, 1958, Vol 32, Nr 3,
pp 635-639 (USSR)

ABSTRACT: The kinetics of   alcohol oxidation has already been
investigated several times, e. g. by Moravskiy and Stingl
(Reference 1). Evans and Day (Reference 2), and others.
B. V. Tronov and collaborators determined that the velo=
city of oxidation of alcohols with potassium permanganate
obeys a second order equation. Merz, Stafford and Waters
(Reference 5) found that the alcohol oxidation is to be
considered a double-electron transformation. As a conse=
quence, Drummond and Waters (Reference 6) take this as a use for

Card 1/4

An Investigation of the Kinetics of the Oxidation of Alcohols
in Solutions. I. The Kinetics of the Oxidation of Alcohols With
Potassium Permanganate and Cerium Sulfate

the extraordinary slow alcohol oxidation by cerium sul-
fate and manganese sulfate. The oxidation kinetics of
some organic substances in acid solutions of cerium sul-
fate were investigated by Conant (Reference 7), Shorter
and Hinshelwood (Reference 8), as well as by S. V. Gcr-
bacher and Ya. I. Vabel' (Reference 9). In the present
paper the activation energy in alcohol oxidations by
potassium permanganate in neutral and acid media, as well
as by acid cerium sulfate solutions, is investigated. A
method of preparation is given. In preliminary experi-
ments it was found that this alcohol oxidation exceeds
the normal one tenfold, where it is assumed that the
reaction of the later is a second order one. Diagrams
and a table of the calculated activation energies of the
        oxidation of a number of alcohols by   potassium
permanganate are given. The oxidation kinetics with ce-
rium sulfate were followed potentiometrically. Because
of the slow course of the reaction, the activation energy

Card 2/4   had to be calculated from the reciprocal temperature by

76-32-3-21/43

An Investigation of the Kinetics of the Oxidation of Alcohols
in Solutions. I. The Kinetics of the Oxidation of Alcohols With
Potassium Perman_anate and Cerium Sulfate

the approximation method. In the paper by B. V. Tronov
(Reference 3), the higher velocity of oxidation by po-
tassium permanganate in an acid medium, as compared to a
neutral one, is explained by the reduction of the electro-
lytic dissociation of manganic acid, which assumption is
in agreement with the values obtained for the activation
energy in the present paper. The difference of the values
of activation energies in oxidations with potassium per-
manganate and cerium sulfate is not only explained by the
assumption according to Merz (Reference 5), but also by
the presence of a high-energy barrier in the cerium-sulfate
oxidations. A certain connection was found to exist between
the activation energy of the latter and the dipole monent,
entailing an increase in the energetic barrier. This phe-
nomenon is explained on an electrochemical basis.
There are 7 figures, 4 tables and 10 references, 3 of
which are Soviet.

Card 3/4

An Investigation of the Kinetics of the
Oxidation of Alcohols in Solutions.
I. The Kinetics of the Oxidation of Alcohols With
Potassium Permanganate and Cerium Sulfate

76 32 3 2 1/43

ASSOCIATION: Khimiko-tekhnclogicheskiy institut im. D. I. Mendeleyeva,
Moskva (Chemical and Technological Institute imeni D. I.
Mendeleyev)

SUBMITTED: November 26, 1956

Card 4/4

AUTHORS: Khachaturyan, O. B., Gorbachev, S. V.   76-32-4-39/43

TITLE: The Polarization of the Reversible Ferri-Ferrocyanide
                  Redox Systems (Polyarizatsiya obratimykh okislitel'no-
                  -vosstanovitel'nykh sistem. Ferri-ferrotsianidy)

ABSTRACT: Investigations of the problem mentioned in the title
                  have been carried out already by many scientists, as
                  there are Grube (Reference 1), Friedenhagen (Reference 2),
                  Von Hayek (Reference 3), Le-Blanc (Reference 4), Gust
                  (Reference 5). V. P. Il'inskiy and N. P. Lapin (Refe-
                  rence 6); the latter pointed out that these processes
                  take place without a diffusion mechanism. In the present
                  paper the temperature-kinetic method of investigation
                  described in references was applied, an U-shaped vessel
                  and platinum electrodes having been used as electrolyser.
                  From the graphically represented experimental data can
                  be seen that the cathode- and anode curves take a symme-
                  trical course, and that limit currents were observed
Card 1/2   at 25, 4o and 6o°C. The amount of effective activation

The Polarization of the Reversible Ferri-   76-32-4-39/43
Ferrocyanide Redox Systems

energy was computed according to a formula and an
interval of 4 ± 0.3 kcal/mol was found. This is regarded
as proof for the diffusive kind of the limit stage of
the process and the course of the polarization curves
is computed according to Nernst. By modifyin the apparatus
the investigations were carried out in mixing and it was
found that the mixing of the liquid exerts a strong in-
fluence on the course of the polarization curve.
There are 2 figures and 1o references, 5 of which are
Soviet.

ASSOCIATION: Khimiko-tekhnologicheskiy institut im. D. I. Mendeleyeva
Moskva (Moscow, Chemical-Technological Institute im.
D. I. Mendeleyev)

SUBMITTED: February 28, 1957.

1. Ferri-ferrocyanide redox systems—Polarization

Card 2/2

AUTHORS: Gorbachev, S. V., Belevskiy, S. P.   SOV/ 76-32-6-18/46

TITLE: The Polarization During the Cathodic Reduction of Nitro
                  Compounds in Connection With the Problem Concerning the
                  Ratio Between the Electrochemical and Photochemical Processes
                  (Polyarizatsiya pri katodnom vosstanovlenii nitrosoyedineniy
                  v svyazi s problemoy sootnosheniya mezhdu elektrokhimicheskimi
                  i fotokhimicheskimi protsessami)

ABSTRACT: Proceeding from a general consideration of electrochemical
                  processes, in which the fact is stressed that the activation
                  energy represents the degree of excitation of the electron
                  shell, an analogy is expected to exist between the results
                  of electrochemical and spectroscopic investigations of systems.
                  The transition of the electron by an external action is
                  said to be the common elementary act of both processes, the
                  specific aspects of both processes, however, having to be
                  taken into account. N. N. Beketov (Ref 1), Baur (Ref 3),
                  N. Ye.Khomutov (Ref 4), Maccol (Ref 7) and Lyons (Ref 8), as
Card 1/4   well as A. Pullman, B. Pullman and G. Berthier (Ref 11),

SOV/ 76-32-6-18/46

The Polarization During the Cathodic Reduction of Nitro Compounds in Connection With the Problem Concerning the Ratio Between the Electrochemical and Photochemical Processes

Watson and Matsen (Ref 12), Bergman (Ref 13) and Hoijtink and van Schooten (Ref 14) dealt with an analogy between electrochemical and photochemical processes. In the present investigation mainly aromatic nitro compounds are reduced on solid cathodes in order to study the influence of the cathode material on the course taken by the process and to approach real conditions in the electrolysis. Views adopted by A. N. Terenin (Ref 15), by N. A. Izgaryshev and A. A. Petrova (Ref 17) and data by S. A. Voytkevich (Ref 18) are mentioned and discussed. Investigations were conducted with the below mentioned compounds at copper and tin electrodes at various temperatures. The experimental technique is described. The fact is mentioned that according to A. A. Petrova (Ref 21) the reduction product of nitromethane of a reduction at 25° on tin cathodes in an hydrochloric acid medium contains β-methylhydroxylamine as a basic product. According to the experimental results the depolarizing effect of the nitrocompounds on a tin cathode is increased in the

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SOV/ 76-52-6-18/46

The Polarization During the Cathodic Reduction of Nitro Compounds in Con-
nection With the Problem Concerning the Ratio Between the Electrochemical
and Photochemical Processes

following order: n-nitroaniline-o-nitrophenol-m-nitrophenol-
-n-nitrotoluene-m-nitroaniline-nitrobenzene-nitromethane.
For the copper cathode the order: n-nitroaniline-m-nitro-
aniline-m-nitrophenol-n-nitrotoluene-o-nitrophenol-nitro-
benzene-nitromethane is given. A complicated influence of
temperature upon the velocity of the electrode reaction was
found. This results in the fact that no definite conclusions
can be drawn as to the nature of polarization. The activation
energy, which was determined independently of the potential
is given to be 4500 cal, which corresponds to the effective
activation energy of a diffusion process. From the evidence
obtained it is concluded that in the case under consideration
the concentration polarization is the decisive factor in
the electrode process. There are 6 figures, 2 tables, and
21 references, 6 of which are Soviet.

Card 3/4

SOV/76-32-6-18/46

The Polarization During the Cathodic Reduction of Nitro Compounds in Connection With the Problem Concerning the Ratio Between the Electrochemical and Photochemical Processes

ASSOCIATION: Khimiko-tekhnologicheskiy institut im. D. I. Mendeleyeva, Moskva
(Moscow, Chemical and Technological Institute imeni D. I. Mendeleyev)

SUBMITTED: January 31, 1957

1. Nitro compounds—Reduction   2. Cathodes—Performance
3. Nitro compounds—Polarization   4. Electrochemistry
5. Photochemistry

Card 4/4

AUTHORS: Gorbachev, S. V., Kholpanov, L. P.   SOV/76-32-7-31/45

TITLE: An Improved Optical System for the Refractographical Method of
              Investigating the Distribution of Dissolved Substances (Uso-
              vershenstvovaniye opticheskoy skhemy refraktograficheskogo
              metoda issledovaniya raspredeleniya rastvorennykh veshchestv)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol 32, Nr 7,
              pp 1661 - 1662 (USSR)

ABSTRACT: In another paper a refractographical method for the determina-
              tion of the concentration of a $CuSO_4$ solution during electro-
              lysis was suggested. In the solution to be investigated the light
              beam went along the cathetus face of a prism, was refracted and
              left at the other cathetus face. The disadvantage of this method
              is the fact that the light beam prior to its refraction passes
              the solution and is deviated from its direction by the various
              concentration gradients of the solution; this fact shows an
              effect on the intensity of the pencil of light. This again may
              cause a change of the black - white boundary in the photographic
              measurement and thus can influence the accuracy of the determina-
Card 1/2   tion. In order to avoid this source of error the authors

An Improved Optical System for the Refractographical   SOV/76-32-7-31/45
Method of Investigating the Distribution of Dissolved Substances

>   presented a modification of the beam direction, with the light
>   beam not passing through the solution layer; thus a change of
>   the direction of the beam is avoided. This method may be em-
>   ployed in the determinations of the concentrations of substances
>   during their dissolution, absorption etc. There are 2 figures.

ASSOCIATION: Khimiko-tekhnologicheskiy institut im. D.I.Mendeleyeva,Moskva
                (Moscow, Chemical and Technical Institute imeni D.I.Mendeleyev)

SUBMITTED: December 25, 1957

                1. Refractometers—Optical systems   2. Solutions—Refractometric
                analysis   3. Materials—Solubility

Card 2/2

AUTHORS: Gorbachev, S. V.,   Kudryashov, I. V.   SOV/76-32-8-30/37

TITLE: An Apparatus for the Automatic Stabilization of the Redox
             Potentials - the Redoxystat (Pribor dlya avtomaticheskoy·
             stabilizatsii okislitel'no-vosstanovitel'nykh potentsialov -
             redoksistat)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 8, pp. 1914-1915
             (USSR)

ABSTRACT: Since in redox reactions the change of the concentration of
             the oxidizing substance may on certain conditions change the
             directions of the reaction it turned out to be useful to se-
             cure an automatic regulation of the redox potential at a
             certain level. An apparatus is described serving for this
             purpose, and automatically recording the course of the redox
             reaction. From a diagram may be seen that a compensation cir-
             cuit with a potentiometer PPTV-1 or P-4, and a mirror gal-
             vanometer, a photorelay with an electromagnet, as well as
             a cell with burets, platinum electrodes and stirrer are
             assembled. As the sensitivity of the mirror galvanometer is
             decisive for the accuracy of the apparatus a polarization re-
Card 1/2   lay according to a scheme by N. G. Alekseyev and V. A.